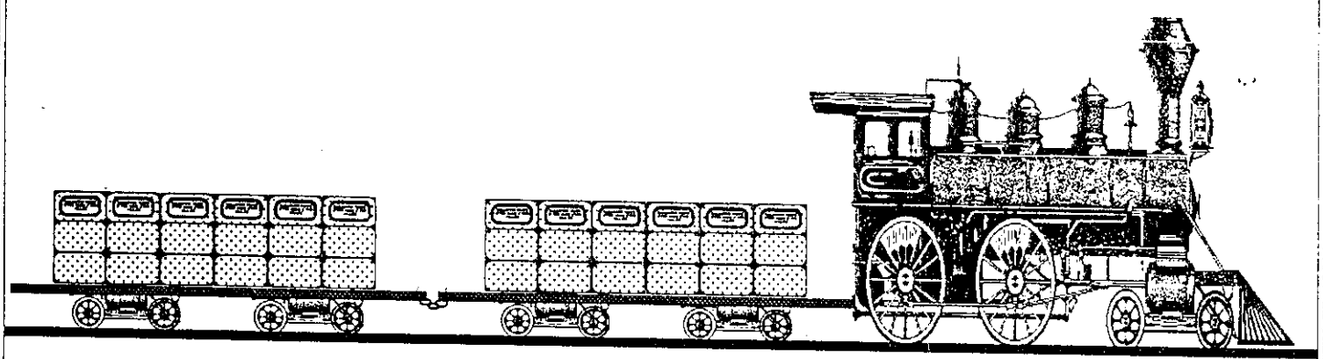
California Environmental
Protection Agency

Department of Toxic
Substances Control

TRANSPORTATION PLAN

Preparation Guidance for Site Remediation



Margaret C. Felts
Deputy Director
Site Mitigation Program

Interim Final
May 1994

California Environmental Protection Agency

Air Resources Board • Department of Pesticide Regulation • Department of Toxic Substances Control • Integrated Waste Management Board
Office of Environmental Health Hazard Assessment • State Water Resources Control Board • Regional Water Quality Control Boards

Pete Wilson
Governor

James M. Strock
Secretary for Environmental Protection

To Guidance Document Users:

This guidance document has been prepared by Cal/EPA Department of Toxic Substances Control (DTSC) Site Mitigation Program for use in investigating and remediating Hazardous Substance Release Sites. The document has undergone extensive review within DTSC, the State Water Resources Control Board, and the nine Regional Water Quality Control Boards (RWQCBs). We endorse this document for use, as appropriate, on any hazardous substance release site where DTSC, RWQCBs or local agencies are participating in the investigation and remediation. This document is intended only as guidance. Its use is not mandatory. Rather, it provides recommendations for site characterization. Therefore, users may wish to discuss the application of this guidance with their oversight agency's project manager before using it at a specific site.

Users should note that this guidance document presents a new look when compared to the typical technical manual. It is concise and to the point. It says what needs to be said in terms that can be understood by the intended audience. This is in keeping with our overall goal of simplifying the process while upholding our important standards.

Although this document has been extensively reviewed, we recognize that there is always room for improvement. You, the users of this guidance, are invited to comment on sections which you liked, inform us of any errors or deficiencies, and provide suggestions for improvement. Please use the comment sheet on the next page. Please submit your comments by January 31, 1995. At that time the document will be revised to include appropriate changes and then issued as "Final" in June 1995. Because this guidance discusses various scientific and technological approaches, we anticipate that it will need periodic revision to reflect improved scientific knowledge and new techniques.

Sincerely,

James M. Strock
Secretary for Environmental Protection

555 Capitol Mall, Suite 235 • Sacramento, California 95814 • (916) 445-3846 • Fax: (916) 445-6401

COMMENT SHEET

This guidance document has been released as an interim final draft. the California Environmental Protection Agency will periodically revise this document to reflect the changing needs of its stake holders. As a user of this document, your comments are important to this ongoing process. Please use this sheet to inform us of any errors, deficiencies or suggested iimprovements to this document. If you identify an error or deficiency, please suggest how it can be corrected. Attach additional sheets if necessary. Send your comments to:

California Department of Toxic Substances Control
P.O. Box 806
Sacramento, CA. 95812-0806

Attn: Technical Guidance Work Group

The next revision of this document is scheduled for June 1995. To allow us time to follow-up and incorporate your comments, please submit your comments by no later than January 31, 1995.

Name: Address:

Name and address are optional, but including them will help us follow-up and address your comments.

Title: Guidance for Preparation of Transportation Plans at Hazardous Substance Release Sites

Section:
Comment:

Suggested Revision:

Please cut here

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FOREWORD

The California Environmental Protection Agency (Cal/EPA) is charged with the responsibility of protecting the state's environment. Within Cal/EPA, the Department of Toxic Substances Control (DTSC) has the responsibility of managing the State's hazardous waste program to protect public health and the environment. The State Water Resources Control Board and the nine Regional Water Quality Control Boards (RWQCBs), also part of Cal/EPA, have the responsibility for coordination and control of water quality, including the protection of the beneficial uses of the waters of the state. Therefore, the RWQCBs work closely with DTSC in protecting the environment.

To aid in characterizing and remediating hazardous substance release sites, DTSC has established a technical guidance work group to oversee the development of guidance documents and recommended procedures for use by its staff, local governmental agencies, responsible parties and their contractors. This document has been prepared to provide guidelines for the preparation of plans to transport hazardous wasteresulting from investigation and remediation of hazardous substance release sites.

Please note that, within the document, the more commonly used terms, *hazardous waste site* and *toxic waste site*, are used synonymously with the term hazardous substance release site. However, it should be noted that any unauthorized release of a substance, hazardous or not, that degrades or threatens to degrade water quality may require corrective action to protect its beneficial use.

This document is one in a series of Cal/EPA guidance documents pertaining to hazardous substance release site remediation.

Additional copies of this document may be obtained by ordering directly from:

Department of General Services
Publications Section
P. O. Box 1015
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Title: Guidelines for the Preparation of Transportation Plans at Hazardous Substances Release Sites

Stock No.: 754 095 810 300

PREFACE

The Department of Toxic Substances Control (Department), within the California Environmental Protection Agency, has the responsibility of managing the State's hazardous waste and site remediation programs to protect public health and the environment. The Department's Site Mitigation Program oversees removal and response actions at hazardous substance release sites in cooperation with other federal, state, and local agencies. The Site Mitigation Program also develops guidance for those involved in the site mitigation process, especially the Department's project managers and the environmental consultants employed by responsible parties or the Department.

This guidance document has been prepared to provide guidelines for the development and implementation of transportation plans for site cleanups that involve off-site disposal, on-site treatment with related disposal, and/or off-site treatment of hazardous wastes/substances. A transportation plan is, in some cases, required by law. In others, it is needed due to the relative hazard of the material to be transported or necessary to respond to the concerns of the affected communities.

This guidance document should be used as a tool to define the scope of site needs and work. All elements should be considered, but only those that pertain to the set of conditions and circumstances at a site should be emphasized in developing the plans. This document will be periodically reviewed, updated, and revised as needed. Therefore, we solicit your comments on improving this document. Please send your suggestions to:

Technical Guidance Work Group Chair
Site Mitigation Program
Department of Toxic Substances
Control
P.O. Box 806
Sacramento, California
95812-0806

The target audience for this guidance document is the experienced project manager in the State or private sector with at least an educational background equivalent to a Bachelors degree in engineering or the environmental sciences.

The goal of this document is to provide technical and scientifically sound guidance for designing and implementing a transportation plan. The intent is to expedite the site remediation process, by providing assistance in identifying the critical factors that need to be considered in making appropriate, defensible, and protective decisions while striving to control costs. The objective is to narrow the range of options recognizing that some judgment will always be needed to balance specific site investigative needs and cost with protection of public health and the environment.

1.0 INTRODUCTION

Site cleanups that involve off-site disposal, on-site treatment with related disposal, and/or off-site treatment of hazardous wastes/substances will benefit from, and in most cases, require early consideration of transportation issues in the form of a written transportation plan. A transportation plan is, in some cases, required by law. For example, Health and Safety Code Section 25169.3 requires:

> *"Before hazardous waste is transported from an abandoned site to another disposal site, all of the following conditions shall be met:*
>
> *(a) The department shall conduct such tests, or cause such tests to be completed by the Responsible party, as are necessary to determine the general chemical and mineral composition of hazardous waste that is being transported.*
>
> *(b) The hazardous waste hauler shall prepare a transportation and safety plan outlining features and procedures to be used by the hauler to protect the public during the transportation process.*
>
> *(c) The department shall review and approve the transportation and safety plan.*
>
> *(d) The hazardous waste hauler shall, under penalty of perjury, certify that he or she will follow the provisions of the transportation and safety plan.*
>
> *(e) The department shall issue a certificate to the hazardous waste hauler certifying that the transportation and safety plan has been approved by the department. The person transporting the waste shall have the certificate in his or her possession while transporting the waste. Such a certificate shall be shown upon demand to any department official, officer of the California Highway Patrol, or any local health officer.*
>
> *The term "abandoned site", as used in this section, means an inactive waste disposal, treatment, or storage facility which cannot, with reasonable effort, be traced to a specific owner; a site whose owner has been determined bankrupt or who has not taken corrective action on or before the date specified in an order issued pursuant to Section 25187; or a location where hazardous waste has been illegally disposed.*
>
> *(f) The requirements of this section shall not apply when the hazardous waste disposal is the direct result of an accidental spill or the department determines that emergency action is needed to protect the environment or the public health."*

For all projects involving the off-site or on-site transportation of hazardous wastes/substances, it should be assumed that a transportation plan is necessary to protect public health and safety and the environment. Health and Safety Code Section 25169.3 should be followed when transporting hazardous waste from an "abandoned site" as defined above. For purposes of the approval specified in Health and Safety Code Section 25169.3 (c), a letter

from the Department approving the transportation plan will suffice.

The level of effort and detail required to prepare a transportation plan will be dictated by the quantity of material to be transported, the degree of hazard associated with the material, factors related to the site and transport route, and pertinent regulatory issues. **All elements should be considered, but only those that pertain to the set of conditions and circumstances at a site should be emphasized in developing the plans.** Specific concerns for the project manager will often center on vehicle or container selection, loading procedures, site entry and egress, routing, regulatory compliance, investigation derived waste disposal, community concerns, and supervision of transportation activities. Protection of public health and the environment, while retaining efficiency and feasibility, should be the primary objective in the development of the transportation plan.

2.0 PURPOSE

The purpose of the transportation plan is to minimize potential health, safety, and environmental risks resulting from the movement of material and/or equipment during site cleanup. Transportation plans should be required as part of any removal workplan or remedial action design approved by the Department that has significant off-site or on-site transport requirements.

The purpose of this guidance document is to assist project managers, consultants, and responsible parties in identifying and responding to critical transportation issues and to provide a consistent and adaptable plan format. Each plan should be tailored to meet the specific requirements of the project.

3.0 APPLICABILITY

This guidance is applicable to sites where the Department is conducting remedial activities (a State-lead Site) or overseeing the work of responsible parties (an RP-lead site). The Department's project manager may want to incorporate the transportation plan contents outlined in this document into orders issued or entered into by the Department. For all projects involving the off-site or on-site transportation of hazardous wastes/ substances, it should be assumed that a transportation plan is necessary to protect public health and safety and the environment. The Department's project manager for the site will determine when a transportation plan is not necessary and is responsible for adequately documenting such a decision in the site file. A guide to assist the Department's project manager in making such a determination is included in Appendix A.

A key factor in developing a transportation plan is the evaluation of the hazardous characteristics and quantity of the material to be transported. For example, a plan to haul large quantities of slightly contaminated soil is likely to emphasize traffic and routing issues, whereas container selection, labeling, and manifesting procedures may be of greater concern in the

transport of a single drum of extremely hazardous waste. The inherent hazards and volume of material will determine the importance and level of detail necessary to evaluate potential community concerns, potential receptor and exposure risks, regulatory issues, health and safety issues, handling operations, personnel training and experience needs, and container, vehicle, and route selection.

The framework governing the transportation of hazardous wastes/ substances is broad in scope. All work should be conducted in accordance with all applicable federal, state, and local statutes, regulations, or ordinances. At a minimum, the following should be evaluated for applicability:

- 40 Code of Federal Regulations (CFR) Parts 261 to 265;
- 29 CFR Part 1910.120;
- 49 CFR Parts 100 to 199;
- California Health and Safety Code, Chapter 6.5, Articles 6, 6.5, and 8;
- California Vehicle Code Section 2402.1;
- California Code of Regulations(CCR) Title 22, Division 4.5, Chapter 12, Article 5;
- CCR Title 22, Division 4.5, Chapter 13, Articles 1-5; and
- CCR Title 8 Section 5192.

A pamphlet entitled "Hazardous Materials Transportation Guides" produced by the U. S. Department of Transportation is included in Appendix B to assist in the evaluation of applicable federal requirements. Other applicable rules may be in place as the result of resolutions passed by the State Water Resources Control Board (and the Regional Boards), Air Resources Board (and the air quality management districts), or local governments. All applicable requirements should be identified during the plan development process.

4.0 TRANSPORTATION PLAN CONTENTS

The content and format of the transportation plan discussed in the this section should be adhered to with additional information included as necessary to meet the specific needs of the project. The transportation plan should be brief, concisely addressing the following elements which pertain to the site. The use of tables and maps to summarize and illustrate information is encouraged. A checklist is provided in Appendix C to assist the writer and reviewer in determining if the transportation plan is complete.

4.1 Background

Provide a brief discussion of the location, history, and regulatory status of the site. Include a description of the removal or remedial action with specific tasks outlined. Include a map of the site as well as a map of the surrounding area with residential, commercial, and industrial areas identified. The map should specifically identify schools, day care facilities, hospital, and other facilities that may house sensitive receptors.

4.2 Purpose and Objective

State the purpose and objective of the plan.

4.3 Characteristics of Waste/Material to be Transported

Describe the waste/material to be transported. Be specific about the appearance, source, approximate quantity, the nature of the contaminants and their associated hazards. State whether the waste/material to be transported is a hazardous waste/substance and how the determination was made. Identify any federal, state or local statutes, regulations or ordinances that apply to the transport of the waste/material. State whether any special procedures for handling the waste are required.

4.4 Destination of Waste/Material

Identify the facility(ies) to which the waste/material will be transported. Describe the fate of the waste/material once it reaches the location(s) (e.g., recycle, dispose, treat). Provide the name, address, phone number and contact person for each facility listed.

4.5 Transportation Mode

Discuss in general how the waste/material will be transported (e.g., truck, rail). It may be appropriate to describe the types of vehicles and containers that will be used to haul a given material. Identify the capacity and special features to prevent releases (e.g., dust covers) for each vehicle type. The transporter should be identified as early as possible. Prior to implementation of a transportation plan, the transporter should be identified. If the waste/material to be transported is a hazardous waste, the transporter should submit proof of valid hauler registration. The responsible party should ensure that all vehicles utilized for hazardous waste transport are properly registered, operated, and placarded in compliance with local, state, and federal requirements.

4.6 Route

Describe the primary and alternate routes to be used during transport. Discuss why these are the preferred routes in terms of avoiding residential areas, peak traffic hours, hazardous road conditions, etc. Include maps of the entire route that clearly identify routine stops (e.g., weigh stations), emergency response resources, and repair facilities along the route. Features of the proposed route that require attention include the location of enforcement and emergency response resources and jurisdictions, potential road and traffic hazards, population centers in route, and features of the route itself such as restrictions, load limitations, bridges and tunnels. Verify that access to the designated routes are not restricted by the California Highway Patrol (CHP), local ordinance, or road maintenance activities.

Estimate round trip time from the site to the facility. Variations due to rush hour traffic should be evaluated. State the anticipated maximum and average number

of round trips required per day. Discuss how many vehicles will be required per day. Provide a schedule for the operation which identifies the period, days, and approximate times of the day trucks will be in operation at the site.

Develop a notification list of emergency service organizations (e.g., fire departments, ambulance services), law enforcement agencies (e.g., CHP, sheriff's departments), and transportation authorities (e.g., Cal Trans, the Public Utilities Commission) that have jurisdiction along the proposed route. Consider notifying all these organizations prior to commencement of hazardous waste/substance transportation activities.

4.7 Traffic Control and Loading Procedures

Discuss the procedures to be used by transportation personnel for entering and leaving the site. Describe any truck staging areas to be utilized near the site. Identify any local traffic problems or hazards. Consider such elements as rush hour traffic, school children, public transportation, etc. Identify the need for lane closures, traffic signs, flagmen and other traffic control measures. Identify any city and/or county requirements related to traffic controls near the site.

Describe in detail, using maps and diagrams as necessary, on-site traffic and loading procedures. Provide a map and discussion of vehicle routing through the site. The following procedures, if applicable, should also be addressed in detail: how and where loading and covering will occur; where weighing will occur; how and where decontamination will be conducted; and the methods employed to seal/cover cargo containers prior to departure from the site to prevent the release of hazardous wastes/substances during transport. When transporting contaminated soil or powder-like materials, containers that do not have a permanent, fixed cover (e.g., dump truck, rail car) should be sealed with a quick hardening foam, tarpaulin or other appropriate material.

Certain characteristics of the site will have a bearing on the degree of environmental monitoring necessary to monitor for releases of materials. These factors include location, accessibility, environmental features, land use, demography, traffic patterns, public perception, the hours and frequency that transportation will take place, entrance and egress control, and local routing.

All vehicles leaving the site will require inspection to ensure proper loading, covering/sealing, decontamination, placarding and manifesting. Describe how such inspections will be conducted and documented. Provide a discussion of the methods that will be utilized to minimize releases of material during loading and prior to covering/sealing the container. Provide a discussion of how the covering employed will prevent the release of hazardous wastes/substances during the transport to an off-site destination.

4.8 Record Keeping

It will be necessary to identify the date, time, weight/volume, waste/material, trucking company, driver, and vehicles used for each trip. Discuss how such records will be gathered and maintained. Describe the record keeping training or instruction that will be provided to site personnel and vehicle operators.

Identify all transportation documents, specifically those required by law, to be carried with the load. State precisely where such documents will be carried. As appropriate, such documents may include: bill of lading identifying the shipment; analytical results representing the load; hazardous waste manifest; maps and complete instructions describing the route to be traveled; and special instructions including emergency procedures and contacts for the transporter.

4.9 Health and Safety

Describe health and safety procedures during loading as they apply to transportation personnel. All workers should be properly trained in hazardous waste operations in accordance with 29 CFR 1910.120 and CCR Title 8 Section 5192. State the type of health and safety training that will be provided to site personnel and vehicle operators. Describe what the transportation personnel will and will not be permitted to do, based on training, during loading. Discuss how the health and safety plan will be communicated to drivers (e.g., tailgate meetings) and how the plan will be enforced.

Describe notification procedures and contingency plans for accidents or breakdowns in route. Notification procedures should identify key personnel who will be responsible for implementing the contingency plan. Each driver should carry a copy and be able to demonstrate an understanding of the plan. Large scale removals often involve several independent trucking companies. If this is the case, it will be necessary to identify a transportation coordinator who is accessible 24 hours a day during hauling operations and who has the ability to communicate with and direct the activities of each driver on and off the site. In addition to designating the transportation coordinator, the transportation plan should contain an organizational structure showing the chain of command for all trucking companies involved.

In an effort to plan for potential containment and cleanup of all on-site accidental releases, include a comprehensive personnel contingency plan which outlines the steps to be taken in the event of injury and/or exposure to contaminants. The personnel contingency plan should be available to all personnel working at the site. Prior to any contractors, subcontractors, and their employees commencing work on the site, the site safety officer should review the plan with them. Identify key personnel and their alternates who will be responsible for on-site safety and response operations.

4.10 Contingency Plan

Include a contingency plan for accidental off-site releases which is distributed to the emergency service organizations, law enforcement agencies, and transportation authorities that have jurisdiction along the proposed route. The contingency plan should, at a minimum, include contaminant descriptions, a hazard analysis, and possible methods for the containment and cleanup of an accidental release. The contingency plan should contain sufficient information for the emergency service organizations to determine if evacuation is necessary. All drivers should carry a copy of the transportation plan and be trained to implement the provisions of the contingency plan for which they are adequately trained and equipped.

Appendix A

GUIDE TO DETERMINING IF A TRANSPORTATION PLAN IS NECESSARY

The primary consideration in making a determination of whether a transportation plan is required for an on-site or off-site remedial action is whether there are significant transportation issues. The obvious transportation factors are the characteristics and volume of material, and distance to be traveled. Factors that are not so apparent but are equally important are community concerns, contamination control, and protection of workers.

The transportation of hazardous wastes/substances may be a part of any removal or remedial action conducted or overseen by the Department. As noted previously, Health and Safety Code Section 25169.3 requires a transportation plan for all "abandoned sites" regardless of the volume of hazardous waste being transported. In the event that the project manager anticipates that a transportation plan will be necessary prior to the Department issuing an order or entering into an enforceable agreement, the contents outlined in this document can be incorporated in the order or agreement. Transportation plans may be required for small volumes of waste/material transport in cases where the responsible party has acted negligently or irresponsibly in the past, community concerns need to be addressed, or there are sensitive environments (e.g., wildlife habitats) along the proposed transportation routes. Conversely, transportation plans may not be required for large volumes of waste/material in cases where the waste/material is not a hazardous waste and the relative hazard is low, community concerns have been addressed, and the potential for exposure to hazardous wastes/substances is minimal.

Once the determination is made that a transportation plan is unnecessary, the Department's project manager should document this decision in a memorandum placed in the site file. The memorandum can be very brief, however, it should address the following:

- The concentration of contaminants;
- The relative hazard of these contaminants should they be accidentally released into the environment where they could impact human health or the environment;
- The number of occurrences during which this transportation will take place (e.g., the number of truck loads, the number of times monitoring waste will be shipped,etc.);
- An analysis showing that all potential community concerns have been identified and addressed;
- The quantity of waste to be shipped;
- A brief description of any treatment activities conducted on-site which would reduce the volume or toxicity of the material to be transported off-site; and

- A statement that clearly indicates why a transportation plan is not required.

A.1 Wastes/Materials Generated During a Remedial Investigation

During a remedial investigation, the following type of wastes/materials may be generated:

- Drill cuttings from the construction of soil borings, piezometers, and monitoring wells;
- Purge water from well development, aquifer property testing and ground water sample collection; and
- Protective clothing and decontamination fluids/materials.

Generally, a transportation plan will not be necessary during the remedial investigation. However, the conditions discussed above may warrant the preparation of a transportation plan.

A.2 Wastes/Materials Generated During Removal Actions/Implementation of Final Remedial Actions

During a removal or remedial action, the following types of wastes may be generated:

- Drums containing material left behind the previous operator;
- Drums containing powdered material that were left by the previous operator;
- Salvage drums containing small packages of wastes/materials;
- Contaminated soil;
- Sludges from unlined waste ponds;
- Plastics or other materials used to contain wastes;
- Contaminated debris; and
- Protective clothing and decontamination fluids/materials.

Generally, a transportation plan will be necessary for a removal or remedial action.

A.3 Wastes/Materials Generated During Ongoing Operation, Maintenance and Monitoring

During an ongoing operation, maintenance, and monitoring program, the following types of waste may be generated:

- Purge water from monitoring wells;
- Filters or spent cartridges from treatment or monitoring systems; and
- Protective clothing and decontamination fluids/materials.

Generally, a transportation plan should be included as a part of the operation, maintenance, and monitoring plan.

Appendix B

"HAZARDOUS MATERIALS TRANSPORTATION GUIDES"

Published by the U. S. Department of Transportation

HAZARDOUS MATERIALS

TRANSPORTATION

GUIDES

Section **Subject**

TRAINING RESOURCES BRANCH (DHM-51)
OFFICE OF HAZARDOUS MATERIALS INITIATIVES AND TRAINING
HAZARDOUS MATERIALS SAFETY
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
U.S. DEPARTMENT OF TRANSPORTATION
WASHINGTON, DC 20590-0001

Revised: February 1991

HAZARDOUS MATERIALS DEFINITIONS

The following definitions have been abstracted from the Code of Federal Regulations, Title 49, Transportation, Parts 100-199. Refer to the referenced sections for complete details. Note: In column (1), 49 CFR 172.101, Hazardous Materials Table, the (+) fixes the proper shipping name and hazard class. The name and class do not change whether the material meets or does not meet the definition of that class.. (49 CFR 172.101(b)(1))

HAZARDOUS MATERIAL - A substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. (See 49 CFR 171.8)

MULTIPLE HAZARDS - A material meeting the definition of more than one hazard class and must be classed according to its position on the list in 49 CFR 173.2(a).

For example, a material that meets the definition of a flammable liquid and an irritating material would be classed as a flammable liquid.

DOT HAZARD CLASS	UN CLASS	DEFINITION
EXPLOSIVES		An Explosive is any chemical compound, mixture, or device which is designed to function by explosion, that is substantially instantaneous with the release of gas and heat. Exception--such compound, mixture, or device which is otherwise specifically classified in Parts 171-180. (See 49 CFR 173.50)
CLASS A	1	Detonating. Maximum hazard. The nine types of Class A explosives are defined in 49 CFR 173.53.
CLASS B	1	Flammable hazard. In general, functions by rapid combustion rather than detonation. Included are explosive devices such as special fireworks, flash powders, etc. (49 CFR 173.88)
CLASS C	1	Minimum hazard - Small arms ammunition, certain types of fireworks and various types of manufactured articles containing restricted quantities of Class A and/or Class B explosives as components. Included are common fireworks and various types of small arms ammunition manufactured articles which contain restricted quantities of Class A or Class B explosives. (49 CFR 173.100)
**	**	

DOT HAZARD CLASS	UN CLASS	DEFINITION
BLASTING AGENT	1	Blasting Agent - A material designed for blasting which has been tested in accordance with 49 CFR 173.114a(b). It must be so insensitive that there is very little probability of: (1) accidental explosion or (2) going from burning to detonation. (49 CFR 173.114a(a))
GASES	2	Compressed Gas - Any material or mixture having in the container an absolute pressure exceeding NON-FLAMMABLE GAS 40 psi at 70°F, OR a pressure exceeding 104 psi at 130°F; or any liquid flammable material having a vapor pressure exceeding 40 psi at 100°F. (49 CFR 173.300(a))
	2	Non-liquefied Compressed Gas - A gas (other than gas in solution) which, under the charged pressure, is entirely gaseous at a temperature of 70°F. (49 CFR 173.300(c))
	2	Liquefied Compressed Gas - A gas which, under the charged pressure, is partially liquid at a temperature of 70°F. (49 CFR 173.300(d))
	2	Compressed Gas in solution - A non-liquified compressed gas which is dissolved in a solvent. (49 CFR 173.300(e))
	2	Flammable Compressed Gas - Any compressed gas meeting criteria as specified in 49 CFR 173.300(a) and (b). This includes: lower flammability limit, flammability limit range, flame projection, or flame propagation.
	2	Nonflammable Gas - Any compressed gas other than a flammable compressed gas.
FLAMMABLE LIQUID	3	Flammable Liquid - Any liquid having a flash point below 100°F. Authorized methods to determine flashpoints are listed in 49 CFR 173.115(d). For exceptions, see 49 CFR 173.115(a).
**	**	

DOT HAZARD CLASS	UN CLASS	DEFINITION
FLAMMABLE LIQUID	3	Pyrophoric Liquid - Any liquid that ignites spontaneously in dry or moist air at or below 130°F. (49 CFR 173.115(c))
COMBUSTIBLE LIQUID	3	Combustible Liquid - Any liquid that does not meet any other hazard class, other than ORM-E, having a flash point at or above 100°F. and below 200°F. For exceptions, see 49 CFR 173.115(b). Authorized methods to determine flashpoints are listed in 49 CFR 173.115(d). Exceptions are found in 49 CFR 173.118(a).
FLAMMABLE SOLID	4	Flammable Solid - Any solid material (other than an explosive) which under normal transportation conditions is liable to cause fires through friction or retained heat from manufacturing or processing. It can be ignited readily and burns so vigorously and persistently, as to create a serious transportation hazard. Included in this class are spontaneously combustible and water-reactive material. (49 CFR 173.150)
	4	Spontaneously Combustible Material (solid) - A solid substance (including sludges and pastes) which may undergo spontaneous heating or self-ignition under normal transportation conditions. These materials may increase in temperature and ignite when exposed to air. (49 CFR 171.8)
	4	Water Reactive Material (solid) - Any solid substance (including sludges and pastes) which react with water by igniting or giving off dangerous quantities of flammable or toxic gases. (49 CFR 171.8)
ORGANIC PEROXIDE **	5 **	Organic Peroxide - Any organic compound containing the bivalent -O-O- structure. It may be considered a derivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by organic radicals. It must be classed as an organic peroxide unless it meets certain criteria listed in 49 CFR 173.151(a).

DOT HAZARD CLASS	UN CLASS	DEFINITION
OXIDIZER	5	An Oxidizer - A substance such as chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter. (49 CFR 173.151)
POISON A	2	Extremely Dangerous Poisons - Poisonous gases or liquids--a very small amount of the gas, or vapor of the liquid, mixed with air is dangerous to life. (49 CFR 173.326)
POISON B	6	Less Dangerous Poisons - Substances, liquid or solid (including pastes and semi-solids), other than Class A Poisons or Irritating Materials--so toxic (or presumed to be toxic) to man that they are a hazard to health during transportation. (49 CFR 173.343(a))
IRRITATING MATERIAL	6	An Irritating Material - A liquid or solid substance which, upon contact with fire or air, gives off dangerous or intensely irritating fumes. It does not include any poisonous material, Class A. (49 CFR173.381)
ETIOLOGIC AGENT	6	An Etiologic agent - A living micro-organism (or its toxin) which causes (or may cause) human disease, and includes those agents listed in 49 CFR 72.3. (49 CFR 173.386)
RADIOACTIVE MATERIAL	7	Radioactive Material - Any material, or combination of materials, that spontaneously gives off ionizing radiation. It has a specific activity greater than 0.002 microcuries per gram. (49 CFR 173.403) (See 49 CFR 173.403(a) through (z) for details.)
CORROSIVE MATERIAL	8	Corrosive Material - A liquid or solid that causes visible destruction or irreversible damage to human skin tissue on contact. Also, it may be a liquid that has a severe corrosion rate on steel. (See 49 CFR 173.240 (a) and (b) for details.)

DOT HAZARD CLASS	UN CLASS	DEFINITION
ORM - OTHER REGULATED MATERIALS	9	(1) Any material that may pose an unreasonable risk to health, safety, and property when transported in commerce; and (2) does not meet any of the definitions of the other hazard classes specified in this subchapter; or (3) has been reclassed an ORM (specifically or permissively) according to this subchapter. (49 CFR 173.500(a))
ORM-A	9	An ORM-A is material which has an anesthetic, irritating, noxious, toxic, or other similar property. If the material leaks during transportation, passengers and crew would experience extreme annoyance and discomfort. (49 CFR 173.500(b)(1))
ORM-B	9	An ORM-B is material, (including a solid when wet with water), the leakage of which could cause significant damage to the vehicle transporting it. Materials meeting one or both of the following criteria are ORM-B materials: (1) specifically designated by name in 49 CFR 172.101 and/or (2) a liquid substance that has a corrosion rate exceeding 0.250 inch per year (IPY) on non-clad aluminum. An acceptable test is described in NACE Standard TM-01-69. (49 CFR 173.500(b)(2))
ORM-C	9	An ORM-C is material which has other inherent characteristics not described as an ORM-A or ORM-B, but which make it unsuitable for shipment, unless properly identified and prepared for transportation. Each ORM-C material is specifically named in 49 CFR 172.101. (49 CFR 173.500(b)(3))

DOT HAZARD CLASS	UN CLASS	DEFINITION
ORM-D	9	An ORM-D is a material such as a consumer commodity which presents a limited hazard during transportation due to its form, quantity and packaging. It must be a material for which exceptions are provided in §172.101. Shipping descriptions applicable to ORM-D materials are found in 49 CFR 172.101. (49 CFR 173.500(b)(4))
ORM-E	9	An ORM-E is a material that is not included in any other hazard class but is subject to the requirements of this subchapter. Materials in this class include: (1) HAZARDOUS WASTE and (2) HAZARDOUS SUBSTANCES, as defined in 49 CFR 171.8. (49 CFR 173.500(b)(5))

THE FOLLOWING ARE OFFERED TO EXPLAIN SOME OF THE ADDITIONAL TERMS USED IN PREPARATION OF HAZARDOUS MATERIALS FOR SHIPMENT. (49 CFR 171.8)

DOT TERM	EXPLANATION
CONSUMER COMMODITY	A material that is packaged or distributed in a form intended or suitable for sale through retail sales agencies. The material is for use by individuals for personal care or household use. This term also includes drugs and medicines. (49 CFR 171.8)
FLASH POINT	The minimum temperature at which the flammable vapors of a substance (in contact with a spark or flame) will ignite. For liquids, see 49 CFR 173.115. For solids, see 49 CFR 173.150.
FORBIDDEN	A material that is prohibited from being offered or accepted for transportation. This prohibition does not apply if these materials are diluted, stabilized, or incorporated in devices AND they are classed in accordance with Part 173 of the subchapter. (See 49 CFR 172.101(d)(1)).

DOT TERM	EXPLANATION
HAZARDOUS SUBSTANCE	A material, including its mixtures and solutions, that: (1) is listed in the Appendix to §172.101; (2) is in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) listed in the Appendix to 49 CFR 172.101; (3) when in a mixture or solution for radionuclides conform to the appendix to 172.101, Table 2 is in a concentration by weight, which equals or exceeds the concentration corresponding to the RQ of the material as shown in the table of the "hazardous substance" definition in 49 CFR 171.8. This definition does not apply to petroleum products that are lubricants or fuels. (See 40 CFR 300.6.)
HAZARDOUS WASTE	Any material that is subject to the Hazardous Waste Manifest Requirements of the U.S. Environmental Protection Agency specified in the CFR Title 40, Part 262. For answers to questions regarding EPA hazardous waste regulations, call 1-800-424-9346 in Washington, DC.
LIMITED QUANTITY	The maximum amount of a hazardous material authorized for specific labeling and packaging exceptions. Consult the section applicable to the particular hazard class. See 49 CFR 173.118, 173.118(a), 173.153, 173.244, 173.306, 173.345, and 173.364.

*THIS HANDOUT IS DESIGNED AS A TRAINING AID FOR ALL INTERESTED PARTIES WHO MAY BECOME INVOLVED WITH HAZARDOUS MATERIALS. IT DOES NOT RELIEVE PERSONS FROM COMPLYING WITH THE DEPARTMENT OF TRANSPORTATION'S HAZARDOUS MATERIALS REGULATIONS. SPECIFIC CRITERIA FOR HAZARD CLASSES AND RELATED DEFINITIONS ARE FOUND IN THE CODE OF FEDERAL REGULATIONS (CFR), TITLE 49, PARTS 100-199.

GUIDE FOR HAZARDOUS MATERIALS SHIPPING PAPERS

USE OF GUIDE - **This Guide is designed for in-house use when reviewing hazardous material shipping paper requirements. However, this document should not be used to determine compliance with the U.S. DOT Hazardous Materials Regulations (HMR).**

1. DEFINITIONS

A. Shipping Paper - **(49 CFR 171.8) A shipping paper is a shipping order, bill of lading, manifest, or other shipping document serving a similar purpose and containing the information required by 49 CFR 172.202, 172.203 and 172.204.**

B. Hazardous Waste Manifest - **(40 CFR 262.20) A hazardous waste manifest is a document (shipping paper) on which all hazardous waste is identified. A copy of the manifest must accompany each shipment of waste from the point of pick-up to the destination. For waste shipments, the hazardous waste manifest satisfies DOT shipping paper requirements, if all DOT requirements for shipping papers are met. (49 CFR 172.205)**

2. SHIPPER'S RESPONSIBILITY - (49 CFR 172.200(a)) The person offering a hazardous material for transport has the responsibility to properly prepare the shipping paper. (See also 49 CFR 173.22.)

3. GENERAL ENTRIES ON SHIPPING PAPERS - (49 CFR 172.201)

A. Contents - **When describing a hazardous material on a shipping paper, that description must conform to the following requirements:**

(1) **When a hazardous material and other materials are both described on the same shipping paper, the hazardous material description entries:**

(a) **Must be entered first, or**

(b) **Must be entered in a contrasting color (or highlighted in a contrasting color - for reproduced copies of the shipping paper only), or**

(c) **Must be identified by the entry "X" placed before the proper shipping name in a column captioned "HM." The "X" may be replaced by "RQ" (Reportable Quantity), if appropriate. (See Figure 1 on following page.)**

(2) **The required shipping description on the original shipping paper and all copies must be legible and printed (manually or mechanically) in English.**

(3) **The required description may not contain any code or abbreviation, unless it is specifically authorized or required, such as "UN," United Nations, "NA," North America, or "Ltd Qty," Limited Quantity.**

(4) A shipping paper may contain additional information concerning the material provided that the information is not inconsistent with the required description. The additional information must be placed after the basic description required by 49 CFR 172.202(a)(4).

(a) When appropriate, the entries "IMO" or "IMO Class" may be entered immediately before or immediately following the class entry in the basic description.

(b) If a material meets the definition of more than one hazard class, the additional hazard class(es) may be entered after the hazard class in the basic description.

NOTE: The International Civil Aviation Organization (ICAO) issues the "Technical Instructions for the Safe Transport of Dangerous Goods by Air" for the international transportation of goods by air.

The International Maritime Organization (IMO) issues the "International Maritime Dangerous Goods Code (IMDG)" for the international transportation of hazardous materials by water.

The terms "dangerous goods" and "hazardous materials" are considered synonymous.

B. Name of Shipper - A shipping paper for a shipment by water must contain the name of the shipper.

C. Emergency Response Telephone Number - A shipping paper must contain an emergency response telephone number, as required by 49 CFR, Subpart G of Part 172.

4. HAZARDOUS MATERIALS DESCRIPTION - (49 CFR 172.202) The shipping description of a hazardous material on a shipping paper must include the following information:

A. Proper Shipping Name - The name prescribed for material in 49 CFR 172.101 Hazardous Materials Table or 172.102 optional HMT MAY NOT BE ABBREVIATED. (49 CFR 172.202 (a) (1)).

B. The Hazard Class of the Material - The class prescribed for material in 49 CFR HM Table 172.101 or 172.102 Optional HMT. (See 49 CFR 172.202(a)(2).)

C. The Identification Number - The number prescribed in the HM Table 172.101 or 172.102 Optional table for the material (preceded by "UN" or "NA," as appropriate). (49 CFR 172.202(a)(3))

D. The Total Quantity By Weight (net or gross, as appropriate) or volume, including the unit of measure, of the hazardous material, except for empty packagings, cylinders of compressed gases, and packagings of greater than 110 gallon capacity. (49 CFR (172.202 (a)(4))

E. Except as otherwise provided in the regulations, the basic description specified in 172.202 (a)(1),(2), and (3) must be in the sequence shown. For example: "Acetone, Flammable liquid, UN 1090." (49 CFR 172.202(b)).

F. The total quantity of the material covered by one description must appear before or after (or both before and after) the basic description. (49 CFR 172.202(c)).

(1) Abbreviations may be used to specify the type of packaging and units of measure of the total quantity. For example: 10 ctns. Paint, Flammable Liquid, UN 1263, 500 lbs. (49 CFR 172.202(c)(1)).

(2) Type of packaging and destination marks may be entered in any appropriate manner before or after the basic description. (49 CFR 172.202(c)(2)).

5. ADDITIONAL DESCRIPTION REQUIREMENTS (49 CFR 172.203) (ALL MODES)

A. Exemptions - Each shipping paper issued in connection with shipment made under an exemption must bear the notation "DOT-E" followed by the exemption number assigned (Example: DOT-E 4648). Place the exemption number adjacent to the description to which the exemption applies. (49 CFR 172.203 (n))

B. Limited Quantities - Descriptions for materials offered as "Limited Quantities" must include the words "Limited Quantities" or "Ltd Qty" following the basic description. (49 CFR 172.203(b))

C. Hazardous Substances (49 CFR 172.203(c))

(1) If the proper shipping name (for a material that is a hazardous substance) does not identify the hazardous substance by name, the following shall be entered, in parentheses, in association with the basic description:

(a) Name of the hazardous substance from the Appendix to the 49 CFR 172.101 Hazardous Materials Table, or

(b) For waste streams, the waste stream number (A "waste stream" is a hazardous waste [liquid, sludge, solid, gas] continuously generated from a manufacturing process. Such waste will be listed in either 40 CFR 261.31 or 40 CFR 261.32, and will be assigned an EPA waste stream number), or

(c) For wastes exhibiting an EPA characteristic of ignitability, corrosivity, reactivity, or EP toxicity the letters "EPA" followed by the word "ignitability," "corrosivity," "reactivity," or "EP toxicity" or the corresponding "D" number, as appropriate.

(2) The letters "RQ" (Reportable Quantity) shall be entered on the shipping paper either before or after the basic description required by 49 CFR 172.202 for each hazardous substance. (See definition in 49 CFR 171.8.)

Example: "RQ, Cresol, Corrosive Material, UN 2076"; or "Hazardous Substance, Solid, n.o.s., ORM-E, NA 9188 (Adipic Acid), RQ."

D. Radioactive Materials - For additional description requirements for radioactive materials, refer to 49 CFR 172.203(d).

GUIDE FOR MARKINGS

USE OF GUIDE - This guide was prepared as an aid to shippers and carriers of hazardous materials. It does not contain or refer to all of the DOT requirements for marking. For specific details, refer to appropriate Section of Title 49, Code of Federal Regulations (CFR), Parts 100-199.

MARKING - means placing on the outside of a shipping container, one or more of the following: the proper shipping name, hazard class, identification number, instructions, caution, and/or weight. Marking also includes any required specification marks on the inside or outside shipping container.

DESCRIPTIVE INFORMATION

I. GENERAL REQUIREMENTS (49 CFR 172.300-172.304)

A. Unless Specifically Excepted, all packages of hazardous materials must be marked with:

1. The proper shipping name.
2. UN or NA Identification number of the contents (49 CFR 172.101 or 49 CFR 172.102, Hazardous Materials Tables.)
3. If the inhalation toxicity of any material in a package falls within the criteria specified in 49 CFR 173.3a(b)(2), the package shall be marked "Inhalation Hazard" in association with the required label(s).
4. The name and address of either the consignee or consignor.

B. All markings must be:

1. Durable and in English, printed or affixed to the surface of the package or on a label, tag or sign.
2. On a background of a sharply contrasting color, and unobscured by labels or attachments.
3. Placed away from other marking that could reduce effectiveness.

II. SPECIFIC REQUIREMENTS

A. HAZARDOUS SUBSTANCES (49 CFR 172.324)

1. For a package of 110 gallons or less that contains a hazardous substance that is not identified by the proper shipping name, one of the following must be entered, in parentheses, in association with the proper shipping name:
   a. Name of the hazardous substance from Appendix to 49 CFR 172.101, or
   b. For waste streams, the waste stream number or
   c. For waste exhibiting an EPA characteristic of ignitability, corrosivity, reactivity, or EP toxicity, the letters EPA followed by "ignitability," or "corrosivity," or "reactivity," or "EP toxicity," or the corresponding "D" number, as appropriate.
2. Each package with a capacity of 110 gallons or less that contains a hazardous substance must display "RQ" in association with the proper shipping name.

B. LIQUID HAZARDOUS MATERIALS (49 CFR 172.312)

1. Must be packed with the closures of the inside packaging in the upright position.
2. Must have marking "THIS SIDE UP" or "THIS END UP" on the outside packaging.
3. Should use arrow symbol on the outside packaging to show upright orientation of packages. (See ANSI Standard MH6.11968 "Pictorial Marking for Handling Goods.")

C. CONTAINERS-OVERPACKS

1. The outside container (overpack) must be marked in accordance with 49 CFR 173.25.

D. CONTAINER-CYLINDERS

1. All cylinders must be marked in accordance with 49 CFR 173.34 and 49 CFR 173.301 through 173.306.
2. Reinspected and Retested Cylinders must be marked in accordance with 49 CFR 173.34(e)(6).

III. TANKS

A. PORTABLE TANKS (49 CFR 172.326 and 49 CFR 172.332) - Portable tanks must be marked with:

1. Proper shipping name - in letters at least 2 inches high and on two opposite sides.
2. Identification number - UN or NA (United Nation or North American) identification number on:
   TWO OPPOSITE SIDES (near proper shipping name) on tanks of less than 1,000 gallons capacity; on EACH SIDE AND EACH END on tanks of more than 1,000 gallon capacity.
3. Name of owner or lessee.
4. All inlets and outlets (except safety relief valves) when carrying compressed gases (DOT-51).
5. Whether or not the inlets and outlets communicate with vapor or liquid (49 CFR 178.245-6(b)).

B. CARGO TANKS - HIGHWAY (49 CFR 172.328) - Cargo tanks must be marked with:

1. Identification number - (49 CFR 172.101)
2. In addition to identification numbers, cargo tanks transporting compressed gases must be marked with:

   (a). Proper shipping name or appropriate common name such as "Refrigerant Gas." Letters must be at least 2 inches high on each end and each side. (49 CFR 172.101, 172.102, and 172.328(c)(1)(2))

   (b). Inlets and outlets (except safety relief valves) shall be marked to designate whether the inlets and outlets communicate with vapor or liquid, when the tank is filled to its maximum permitted filling density. (49 CFR 178.337-9 for DOT MC 331 tanks)

NOTE: When ID numbers are displayed on placards, orange panels are not required. When ID numbers are displayed on orange panels, or white square-on-point display configurations, appropriate placards are ALSO REQUIRED. For materials in hazard classes for which placards are specified and identification numbers are required, but for which ID numbers may not be displayed on the placards required for the material (49 CFR 172.334(a)), ID numbers must be displayed on orange panels or on plain white square-on-point display configuration in association with the placard. ID numbers on white square-on-point display configuration are considered markings and the display is <u>not</u> a placard. (49 CFR 172.332, 172.334, 172.336)

C. TANKS CARS (49 CFR 172.330) - Certain cars are required to be marked on each side and each end (49 CFR 172.332 and Parts 173 and 179 for specific details). If required to be marked, they must include:

1. Proper shipping name or appropriate common name in letters at least 4 inches high with at least a 5/8" stroke.
2. Identification numbers - Display the appropriate number(s) (49 CFR 172.101) on placards, orange panels or white square-on-point display configurations.
3. The accurate name of the contents contained in the tank.

NOTE: For requirements for multi-unit tank car tanks, see 49 CFR 172.330(d)-(f).

IV. BULK PACKAGING - (other than portable tanks, cargo tanks, tank cars and multi-unit tank car tanks) 49 CFR 172.331

A. Includes packages meeting the following criteria: (see 49 CFR 171.8)

1. Internal volume greater than 118.9 gallons (450 liters) for liquids, or
2. A capacity greater than 881.8 pounds (400 kilograms) for solids, or
3. A water capacity greater than 1000 pounds (453.6 kilograms) for a gas as defined in 49 CFR 173.300.

B. Mark packages as prescribed in 49 CFR 172.332 or 172.336(b), as appropriate, with the identification number specified in 172.101 when authorized:

1. On two opposite sides for packages of 1000 gallons (3785.4 liters or 133.7 cubic feet) or less capacity.
2. On each side and end for packages greater than 1000 gallons (3785.4 liters or 133.7 cubic feet) capacity. Identification numbers shall be displayed on orange panels or specified placards, or when appropriate, on white square-on-point display configurations having the same outside dimensions as a placard.

V. RADIOACTIVE MATERIALS (49 CFR 172.310) - In addition to any other marking required by Subpart D of 49 CFR 172 (Marking), each package must be marked as follows:

A. Gross weight must be marked on containers weighing over 110 pounds.
B. "TYPE A" or "TYPE B"(as appropriate) in letters at least 1/2 inch high.
C. "USA," must follow the specification markings or package certification on export shipments.

VI. OTHER REGULATED MATERIALS (ORM's) (49 CFR 172.316)

A. Place the appropriate ORM designation immediately following or below the proper shipping name on at least one side or end of the package.
B. Marking must be within a rectangular border - approximately 1/4 inch in size on each side of "ORM___" (ORM designation).

NOTE: By these markings, the shipper certifies that the material is properly described, classed, packaged, marked, labeled, and in proper condition for transportation. The shipper's certification is still required on the shipping paper (§172.204). When ID numbers are required, they must be displayed on either orange panels (§172.332 (b)) or on a plain white square-on-point configuration having the same dimensions as a placard.

OTHER MARKING REQUIREMENTS

I. REQUALIFIED CONTAINERS - DRUMS (marked by reconditioner). Some steel containers in the DOT Series (DOT 17C, 17E, and 17H) may be qualified for reuse by a DOT-registered reconditioner of drums. The drums are stripped of labels, exemption numbers, and other markings. They are reconditioned to meet 49 CFR 173.28 (m) and marked with the appropriate assigned registration number.

II. CYLINDERS & TANKS - (Marked with inspection and/or retest date). Reusable cylinders, portable tanks, cargo tanks and tank cars must be either visually inspected or retested at periodic intervals. The date of requalification must be on the container. (See 49 CFR 173.24, 173.31, 173.32, 173.33, and 173.34.)

III. CARGO HEATERS - Cargo heaters authorized for use with flammable liquid or gas must be marked in accordance with 49 CFR 177.834 (l)(1)(2)(E) and (F).

IV. MOTOR VEHICLES - A carrier may not move a transport vehicle containing hazardous material unless the vehicle is marked in accordance with Part 172 or unless an emergency exists. (See 49 CFR 177.823.)

SPECIFICATION CONTAINERS

I. GENERAL - Specification containers must be marked with DOT specification numbers under which the containers are made (49 CFR Parts 178 and 179). The manufacturer's name and address or symbol must be registered with the Associate Administrator for Hazardous Materials Safety. Duplicate symbols are not authorized.

II. MARKINGS - All containers must comply with the marking requirements of 49 CFR 173.24, Parts 178 and 179. Exceptions for Canadian and other import/export situations are found in 49 CFR 171.12 and 171.12a.

NOTE: For certain containers, specific detailed information (such as original test date information and type of material) are required. (See Parts 178 and 179.) As a final check before offering a shipment for transportation, visually inspect the shipment.

This handout does not contain all the marking requirements. It is designed as a guide only. For details on markings, consult the Code of Federal Regulations, Title 49, Parts 100-199.

Revised: February 1991

GUIDE FOR HAZARDOUS MATERIALS SHIPPERS

USE OF GUIDE - This Guide is presented as an aid to shippers of hazardous materials. It does not contain or refer to all of the DOT requirements for shipping hazardous materials. For specific details, refer to all of the DOT requirements for shipping hazardous materials. For specific details, refer to the Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-199.

The following is offered as a step-by-step procedure to aid in compliance with the applicable DOT Regulations.

STEP 1 - DETERMINE THE PROPER SHIPPING NAME - The shipper must determine the proper shipping name of the materials as listed in the Hazardous Materials Table, 49 CFR 172.101, Column (2).

STEP 2 - DETERMINE THE HAZARD CLASS OR CLASSES

A. Refer to the Table, 49 CFR 172.101, Column (3) and locate the hazard class of the material.
B. If more than one class is shown for the proper shipping name, determine the proper class by definition.
C. If the materials have more than one hazard, classify the material based on the order of hazards in 49 CFR 173.2.

STEP 3 - SELECT THE PROPER IDENTIFICATION NUMBERS

A. Refer to the Table, 49 CFR 172.101, Column (3a) and select the Identification Number (ID) that corresponds to the proper shipping name and hazard class.
B. Enter the ID number(s) on the shipping papers and display them, as required, on packagings, placards and/or orange panels.

STEP 4 - DETERMINE THE MODE(S) OF TRANSPORT TO ULTIMATE DESTINATION

A. As a shipper, you must assure yourself that the shipment complies with various modal requirements.
B. The modal requirements may affect the following: (1) Packaging; (2) Quantity per Package; (3) Marking; (4) Labeling; (5) Shipping papers; (6) Certification.

STEP 5 - SELECT THE PROPER LABEL(S) AND APPLY AS REQUIRED

A. Refer to the Table, 49 CFR 172.101, Column (4) for required labels.
B. For details on labeling refer to: (1) Additional Labels, 49 CFR 172.402; (2) Placement of Labels 49 CFR 172.406; (3) Packagings (Mixed or Consolidated), 49 CFR 172.404(a) and (b); (4) Packages Containing Samples, 49 CFR 172.402(h); (5) Radioactive Materials, 49 CFR 172.403; and, (6) Authorized Label Modifications, 49 CFR 172.405.

STEP 6 - DETERMINE AND SELECT THE PROPER PACKAGES

A. Refer to the Table, 49 CFR 172.101, Column 5(a) for exceptions and Column (5b) for specification packagings. Consider the following when selecting an authorized package: Quantity per package; Cushioning material, if required; Proper closure and reinforcement; Proper pressure; Outage; etc. as required.
B. If packaged by a prior shipper, make sure the packaging is correct and in proper condition for transportation.

STEP 7 - MARK THE PACKAGING (INCLUDING OVERPACKS)

A. Apply the required markings (49 CFR 172.300); Proper shipping name and ID number, when required (49 CFR 172.301); Name and address of Consignee or Consignor (49 CFR 172.306).
B. For details and other required markings, see 49 CFR 172.300 through 172.338.

STEP 8 - PREPARE THE SHIPPING PAPERS

A. The basic requirements for preparing shipping papers include: Proper Shipping name; Hazard class; ID number; Total quantity; Shipper's certification; and emergency response telephone number.
B. Make all entries on the shipping papers using the information required and in proper sequence (49 CFR 172.202).
C. For additional requirements, see 49 CFR 172.200 through 172.205.

STEP 9 - CERTIFICATION

A. Each shipper must certify by printing (manually or mechanically) on the shipping papers that the materials being offered for shipment are properly classified, described, packaged, marked and labeled, and in proper condition for transportation according to the applicable DOT Regulations (49 CFR 172.204).
B. For surface shipments; see 49 CFR 172.204(a) and (b); for air shipments, see 49 CFR 172.204(c).

STEP 10 - LOADING, BLOCKING AND BRACING - When loading hazardous materials into the transport vehicle or freight container, each package must be loaded, blocked and braced in accordance with the requirements for mode of transport.

A. If the shipper loads the freight container or transport vehicle, the shipper is responsible for the proper loading, blocking, and bracing of the materials.
B. If the carrier does the loading, the carrier is responsible.

STEP 11 - DETERMINE THE PROPER PLACARD(S) - Each person who offers hazardous materials for transportation must determine that the placarding requirements have been met.

A. For Highway, unless the vehicle is already correctly placarded, the shipper must provide the required placard(s) and required ID number(s) (49 CFR 172.506).
B. For Rail, if loaded by the shipper, the shipper must placard the rail car if placards are required. (49 CFR 172.508)
C. For Air and Water shipments, the shipper has the responsibility to apply the proper placards.

STEP 12 - HAZARDOUS WASTE/HAZARDOUS SUBSTANCE

A. If the material is classed as a hazardous waste or hazardous substance, most of the above steps will be applicable.
B. Pertinent Environmental Protection Agency Regulations are found in the Code of Federal Regulations, Title 40, Part 262.

AS A FINAL CHECK AND BEFORE OFFERING THE SHIPMENT FOR TRANSPORTATION, VISUALLY INSPECT YOUR SHIPMENT. THE SHIPPER SHOULD ENSURE THAT EMERGENCY RESPONSE INFORMATION IS ON THE VEHICLE FOR TRANSPORTATION OF HAZARDOUS MATERIALS.

Revised: February 1991

GUIDE FOR HAZARDOUS MATERIALS CARRIERS

USE OF GUIDE - This Guide was prepared as an aid to carriers of hazardous materials. It does not contain or refer to all of the DOT requirements for transporting hazardous materials. For specific details, refer to the Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-199.

Basically, all "for hire" carriers and all "private carriers" are subject to the same or at least very similar DOT hazardous materials regulations.

Containerization and other modern freight handling procedures frequently prevent initial carriers from making physical inspections of the freight. It is more difficult for interline (secondary) carriers to determine the physical condition of freight or regulatory compliance. Carriers, therefore, must frequently accept the word of shippers as to the suitability of the package and the accuracy of the material description. Therefore, it is very important to carefully review the shipping documents including the shippers' certification. Always visually inspect the transport vehicle or freight container for leaks or potential problems.

Careful attention to the following subject areas will aid in complying with the "Carrier Regulations":

I. DETERMINE EMPLOYEE QUALIFICATIONS

"It is the duty of each motor carrier to comply with the prescribed regulations and to thoroughly instruct employees in relation thereto." [Refer to CFR, Title 49, §174.7 (Rail); §175.20 (Air); §176.13 (Water); and §177.800(b) (Highway)].

This means that carriers are required to make certain that employees who have any responsibility for receiving, processing or transporting hazardous materials are thoroughly instructed. They must know the applicable regulations that apply to their job functions. The following suggestions will help to meet this requirement:

A. Identify all personnel who have hazardous materials transportation responsibilities.
B. Determine what additional instruction or training each needs (if any).
C. Assure that those needing instruction receive the instruction.
D. Maintain records of training.
E. Periodically review training needs and maintain the required expertise.

II. DETERMINE CONDITION OF TRANSPORT VEHICLE

A. Make certain that the cargo space is suitable for loading. It should be free of nails and other protruding sharp objects.
B. Make certain that the vehicle is suitable for the material to be loaded. It must be in compliance with applicable carrier safety and hazardous materials regulations, as well.

III. MAY THE SHIPMENT BE ACCEPTED FOR TRANSPORT?

"No person may accept for transportation any shipment of hazardous material that is not in accordance with Parts 171, 172, and 173." [Refer to CFR, Title 49, §174.3 (Rail); 175.3 (Air); 176.3 (Water); 177.801 (Highway)].

To comply with this provision, a carrier must:

A. Determine that the shipping papers are prepared in proper format and are accurate and complete. At minimum, they must include the proper shipping name, hazard class, ID number, quantity, emergency response telephone number, and consignee (or consignor) name and address.
B. Obtain a proper shipper's certificate (unless excepted).
C. Determine that proper placard(s) and ID number(s) are displayed, when required.
D. Determine that emergeny response information is on the vehicle.

When practical, a carrier should also determine that:

A. Authorized packagings are used and that they are in proper condition for transportation.
B. Each package is properly marked and labeled, when required.
C. The freight is adequately blocked and braced to prevent movement and/or damage in transit.

IV. IS THE SHIPMENT TO BE INTERLINED?

A. Properly prepare the material so that the secondary carrier will accept it from you. This is particularly important for intermodal and international shipments.
B. Modal requirements may affect the following: (1) Packaging; (2) Quantity per package; (3) Marking; (4) Labeling; (5) Shipping papers; (6) Certification.

V. CARRIER LOADED FREIGHT

When the carrier loads the transport vehicle, make certain that:

A. Documentation matches the freight.
B. Materials are loaded in accordance with 49 CFR 177.848.
C. Poisons are not loaded with foodstuffs (unless excepted).
D. Damaged or leaking packages are not loaded.
E. Freight is properly blocked and braced to prevent damage in transit.
F. Proper placards and ID numbers are displayed, when required.
G. Required documentation is furnished by the driver/pilot/conductor/captain.

VI. HAZARDOUS WASTE /HAZARDOUS SUBSTANCE

A. When the material is classified as a hazardous waste or hazardous substance, there are additional registration, identification, and documentation regulations as stated in 49 CFR 172.205 and 172.324.
B. Pertinent Environmental Protection Agency Regulations are found in the Code of Federal Regulations, Title 40, Part 262.

VII. INCIDENT REPORTS

The carrier who transports hazardous materials (including hazardous waste and hazardous substances) is responsible for reporting requirements. Most incidents involving unintentional releases of hazardous materials in transportation must be reported to DOT. Detailed criteria concerning telephonic and/or written reports are published in CFR, Title 49, Sections 171.15 and 171.16.

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INDICATORS OF HAZARDOUS MATERIALS SHIPMENT VIOLATIONS

The enforcer, shipper, container manufacturer, or carrier may use this partial listing of items to spot check for compliance with the DOT Hazardous Materials Regulations. Included in this listing are indicators only and not necessarily violations in and of themselves.

The hazardous materials regulations for shippers are found in the Code of Federal Regulations, Title 49, Parts 171, 172, 173, 178, 179 and 180. These Parts of 49 CFR contain general requirements and communication regulations. This list may be used as a guide when looking for discrepancies or making a compliance inspection. Areas to consider include, but are not limited to: classification, packaging, marking, labeling, placarding, loading, blocking and documentation. When using this information, remember it is designed to be used as a guide only and does not cover all aspects of the regulations.

I. PROPER SHIPPING NAME AND HAZARD CLASS

A. Inaccurate designation of hazard class.
B. Failure to properly classify material having more than one hazard. (49 CFR 173.2)
C. Inaccurate description and/or proper shipping name for material being shipped (49 CFR 172.101 and 172.102)
D. Omission of technical name or names of material following n.o.s. description of material. CFR (49 CFR 172.203(k))
E. When required, the letters "RQ" not displayed in association with the proper shipping name. (49 CFR 172.203(c)(2))
F. Missing emergency response information and telephone number.

II. PACKAGING (CONTAINERS IN GENERAL)

A. Use of DOT specification packages not authorized for the material being shipped.
B. Use of containers that are leaking. (49 CFR 173.24)
C. Manufacturing and marking containers as meeting a DOT specification when they do not meet the specification.
D. Packaging exceeding maximum quantity limitations for materials.
E. Packages improperly marked.
F. Offering for shipment improperly packaged material.
G. Consignee or consignor's name marking omitted from packaging. (49 CFR 172.306)
H. Identification numbers omitted on packagings. (49 CFR 172.301)

III. CONTAINERS (MISCELLANEOUS)

A. STEEL

1. Labeled containers with no DOT specification marking. (Commonly found violations are 5 gallon 29 gauge metal pails and 5 gallon rectangular cans).
2. Packages of hazardous materials with temporary repairs (e.g. damaged, sealed with tape, putty, chewing gum, or screws).
3. Labeled containers in improper condition, i.e., dented, rusted or corroded. (NOTE: Some of these are judgmental decisions).
4. Specification marking is illegible on labeled containers.

5. Labeled reused containers marked "NRC" (look for old date of manufacturer, dents, rust, and paint layers).
6. Labeled reused containers marked "STC" and/or 17C, 17E, and 17H with no reconditioner's marking.
7. Labeled reused containers with a reconditioner's marking that is not a DOT 17C, 17E, or 17H container.
8. Labeled 55 gallon open-head drums with 2 rolling hoops and/or less than 5/8 inch ring bolt, non-drop forged ring lugs, and/or "lever lock" ring closures. (Good possibility of non-DOT specification).
9. Imported drums marked as meeting the DOT Hazardous Materials Regulations.

B. FIBERBOARD BOXES

1. Boxes with no DOT specification marking, for example, when inside packagings are larger than the "limited quantity" exception for the commodity and specification packaging is required.
2. Boxes marked with DOT specification marking which are poorly constructed (i.e., gaps, uneven closures, seams and joint separation).
3. If inner flaps do not meet, are fill-in pieces used to fill void?
4. Boxes damaged by water.
5. Improperly closed boxes (look for masking tape, cellophane tape, and string).
6. Non-DOT specification fiberboard box used in lieu of specification container, when required.

C. POLYETHYLENE PACKAGINGS

1. Open-head polyethylene packagings used for materials not authorized to be in them.
2. Illegible marked packagings.
3. Leaking containers offered for transportation.
4. When poison is shipped, is the container marked "POISON"?

D. FIBER DRUMS

1. Non-DOT specification fiber drums.
2. Fiber drums constructed of materials weaker than required by the specification.
3. Use of fiber drums marked DOT-21P without inside polyethylene liner.
4. Using fiber drums marked "STC" more than once for shipping hazardous materials.
5. Damaged fiber drums.
6. Improper markings on containers for the commodity being shipped.

E. CYLINDERS

1. Reuse of single-use cylinders such as DOT Specification 39.
2. Cylinders in use beyond test date.
3. Cylinders in improper condition:
   a. No valve protection
   b. Bulge in side
   c. Dented or corroded
   d. Defective valve
4. Cylinders refilled by other than the owner of the cylinder and without the permission of the owner.
5. Cylinders improperly marked, e.g. duplication of serial numbers.

6. Cylinders offered for transportation without proper identification of contents.
7. Identification symbols not registered with the Department of Transportation.
8. Illegible cylinder markings.

F. PORTABLE TANKS

1. Name of owners or lessee omitted on tank.
2. No labels and/or placards displayed on tank containing hazardous materials.
3. No identification number displayed on the placard or on an orange panel. (§ 172.326)

G. CARGO TANKS (QUALIFICATION AND MAINTENANCE) (49 CFR 180.401-417)

1. Using a cargo tank without proper identification of contents.
2. Improperly marked, e.g. size of marking or not marked in contrasting color.
3. Omission of the marking "QT" (Quenched and Tempered Steel or "NQT" (other than Quenched and Tempered Steel), when required on cargo tanks. (49 CFR 172.328(d) and 173.315)
4. Omission of identification number on placard or orange panel.
5. Test Date Markings missing or out-of-date.

IV. MARKING OF CONTAINERS (49 CFR 172.300-172.338)

A. No proper shipping name and/or ID number on the container. (49 CFR 172.301)
B. No name and address of consignee or consignor on the container. (49 CFR 172.306)
C. No DOT Exemption number on containers shipped under DOT Exemptions. (49 CFR 173.22(a)(1)(iv))
D. Container marking not in a contrasting color. (49 CFR 172.304)
E. Gross weight not marked on radioactive materials packages weighing over 110 pounds. (49 CFR 172.310)
F. Container of liquid hazardous material not marked on outside "THIS END UP" or "THIS SIDE UP." (49 CFR 172.312)
G. Reconditioned drums improperly marked. (49 CFR 173.28)
H. USA not included as part of the DOT Specification markings for radioactive materials packages destined for export. (49 CFR 172.310)
I. Portable tanks not marked with proper name of the hazardous material. (49 CFR 172.326)
J. Omission of identification numbers (when required on placard or orange panel. (49 CFR 172.332)
K. Omission of marking of INHALATION HAZARD, when required. (49 CFR 172.301)

V. LABELING (49 CFR 172.400-172.450)

A. No labels on outer container to represent mixed packaging of hazardous materials. (49 CFR 172.404)
B. Label on the container not consistent with the hazard class on the shipping paper. (49 CFR 172.400)
C. Use of obsolete labels. (49 CFR 172.407)
D. Color and/or size of label does not meet standard. (49 CFR 172.407)
E. No label on shipments destined for air transport. (49 CFR 172.402)
F. Labeling containers not authorized to be labeled. (49 CFR 172.400)
G. No label on "LIMITED QUANTITIES" offered for air transportation. (See appropriate section 49 CFR Part 173.)

Appendix C

CHECKLIST FOR REVIEWING TRANSPORTATION PLANS

The purpose of this checklist is to provide a guide for the reviewer in reaching a decision as to whether a specific transportation plan is adequate for approval.

1.0 TRANSPORTATION PLAN CONTENTS:

1.1 Background

____ Does the plan identify the site location?

____ Does the plan discuss the site history?

____ Does the plan discuss the site's regulatory status?

____ Does the plan describe the removal or remedial action?

____ Does the plan outline the specific tasks of the removal or remedial action?

____ Does the plan include a site map?

____ Does the plan include a map of the surrounding area with residential, industrial, and commercial areas identified?

1.2 Purpose and Objective

____ Does the plan state its purpose and objective?

1.3 Characteristics of Waste/Material to be Transported

____ Does the plan describe the waste/material to be transported?

____ Does the plan describe the appearance of the waste/material?

____ Does the plan identify the source of the waste/material?

____ Does the plan provide an estimate of the quantity of the waste/material?

____ Does the plan discuss the physical and chemical nature of the contaminants in the waste/material?

____ Does the plan describe the hazards associated with the contaminants?

____ Does the plan identify the waste/material as hazardous or non-hazardous?

____ Does the plan provide a discussion of the hazardous (or non-hazardous) determination?

____ Does the plan identify any federal, state, or local statutes, regulations, or ordinances that apply to the transport of the waste/material?

____ Does the plan state whether any special procedures are required for handling the waste?

1.4 Destination of Waste/Material

____ Does the plan identify the facility(ies) to which the waste/material will be transported?

____ Does the plan describe the fate of the waste/material once it reaches the facility(ies)?

____ Does the plan provide the name, address, and telephone number of each facility listed?

____ Does the plan identify a contact person for each facility listed?

1.5 Transportation Mode

____ Does the plan identify the transportation mode (e.g., truck, rail)?

____ Does the plan describe the vehicles and containers (e.g., roll-off bin, rail car)?

____ Does the plan specify the capacity of the containers?

____ Does the plan identify any special features (e.g., seals, liners, covers) for each vehicle type?

____ Does the plan identify the transporter(s)?

____ Does the plan contain proof of valid hauler registration for the transport of hazardous wastes?

1.6 Route

____ Does the plan include a description and map of the primary route?

____ Does the plan include a description and map of the alternate routes?

____ Do the route maps clearly identify routine stops (e.g., weigh stations)?

____ Does the plan include a discussion of why these routes were chosen?

____ Does the route avoid, to the extent possible, residential areas?

____ Do the hours of transport avoid, to the extent possible, peak traffic hours?

____ Does the route avoid, to the extent possible, potentially hazardous road conditions (e.g., night transport, inclement weather)?

____ Does the plan specify the emergency response resources along the route?

___ Does the plan identify repair facilities along the route?

___ Did the preparer verify that the routes specified are not restricted by the California Highway Patrol (CHP), local ordinance, or road maintenance activities?

___ Does the plan provide an estimated round trip time from the site to the facility?

___ Does the plan provide an analysis of variations in trip time due to rush hour traffic?

___ Does the plan contain an estimate of the maximum and average number of round trips required per day?

___ Does the plan contain an estimate of the total number of vehicles that will be required per day?

___ Does the plan provide a schedule for operation which includes the period, days, and approximate times of the day trucks will be in operation?

___ Does the plan contain a notification list of emergency service organizations (e.g., fire departments, ambulance services), law enforcement agencies (e.g., CHP, sheriff's departments), and transportation authorities (e.g., Cal Trans, the Public Utilities Commission)?

1.7 Traffic Control and Loading Procedures

___ Does the plan discuss procedures/ routes to be used by transportation personnel for entering and leaving the site?

___ Does the plan describe any truck staging areas including an address for the staging area?

___ Does the plan identify any local traffic problems or hazards?

___ Does the plan identify the need for lane closures, traffic signs, flagmen and other traffic controls?

___ Does the plan provide adequate detail in the use of lane closure, traffic signs, flagmen, or other traffic controls?

___ Does the plan identify any city and/or county requirements related to traffic controls near the site?

___ Does the plan describe, using maps and diagrams as necessary, on-site traffic and loading procedures?

___ Does the plan provide a map and discussion of vehicle routing through the site?

___ Does the plan describe procedures for loading?

____ Does the plan describe procedures for covering (if applicable)?

____ Does the plan describe procedures for the weighing of loads (if applicable)?

____ Does the plan describe how and where decontamination will be conducted?

____ Does the plan describe the methods employed to seal/cover cargo containers prior to departure from the site to prevent the release of hazardous wastes/substances during transport (if applicable)?

____ Does the plan describe how the load will be covered? Note: for transportation of contaminated soil or powder-like materials by cargo container without a permanent fixed cover, a quick hardening foam, tarpaulin or other appropriate containment should be made.

____ Does the plan describe procedures for vehicle decontamination?

____ Does the plan evaluate all the factors necessary to determine the level of environmental monitoring necessary?

____ Does the plan describe the procedures for inspecting vehicles prior to departure from the site? Note: the inspection should ensure proper loading, covering/sealing, decontamination, placarding and manifesting.

____ Does the plan describe how such inspections will be conducted and documented?

____ Does the plan provide a discussion of the methods to be utilized to minimize releases of material during loading and prior to covering/sealing the container?

1.8 Record Keeping

____ Does the plan describe how the records which identify the date, time, weight/volume, waste/material, trucking company, driver, and vehicle used for each trip will be gathered?

____ Does the plan discuss how such records will be maintained?

____ Does the plan describe the record keeping training or instruction that will be provided to site personnel and vehicle operators?

____ Does the plan identify all transportation documents, specifically those required by law, to be carried with the load? Note: the location of these documents should be specified. Such documents may include: bill of lading identifying the shipment; analytical results representing the load; hazardous waste manifest; maps and complete instructions describing the route to be traveled; and special instructions including emergency

procedures and contacts for the transporter.

1.9 Health and Safety

___ Does the plan describe health and safety procedures during loading as they apply to transportation personnel?

___ Does the plan require that workers be properly trained in hazardous waste operations in accordance with 29 CFR 1910.120 and CCR Title 8 Section 5192 (if applicable)?

___ Does the plan state the type of health and safety training to be provided to site personnel and vehicle operators?

___ Does the plan describe the specific tasks assigned to personnel and those that are strictly prohibited?

___ Does the plan discuss how the health and safety plan will be communicated to drivers and how the plan will be enforced?

___ Does the plan describe notification procedures and contingency plans for accidents or breakdowns in route?

___ Does the plan require each driver to carry a copy and be able to demonstrate an understanding of the contingency plan?

___ Does the plan designate a transportation coordinator? Note: large scale projects often involve several independent trucking companies. In this case, it will be necessary to identify a transportation coordinator who is accessible 24 hours a day during hauling operations and who has the ability to communicate with and direct the activities of each driver on and off the site.

___ Does the plan provide an organizational structure showing the chain of command for all trucking companies involved?

___ Does the plan include an on-site contingency plan to be implemented in the event of an on-site release, employee exposure or injury? Note: the on-site contingency plan should be available to all personnel working at the site.

___ Does the plan require the site safety officer to review the contingency plan with all contractors, subcontractors and their employees prior to commencing work on the site?

___ Does the plan identify key personnel and their alternates who will be responsible for on-site safety and on-site response operations?

1.10 Contingency Plan

___ Does the plan include a contingency plan for accidental off-site releases?

____ Will the contingency plan be distributed to emergency service organizations, law enforcement agencies and transportation authorities that have jurisdiction along the proposed route? Note: notify all these organizations prior to commencement of any transportation activities.

____ Does the contingency plan include contaminant descriptions, a hazard analysis, and possible methods for the containment and cleanup of an accidental release? Note: the contingency plan should contain sufficient information for the emergency service organizations to determine if evacuation is necessary.

____ Does the plan require drivers to carry a copy of the contingency plan?

____ Does the plan require that drivers be trained to implement the provisions of the contingency plan for which they are adequately trained and equipped?